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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/579,504

05/15/2006

Yang-Suk Kim

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23474

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04/19/2007

FLYNN THIEL BOUTELL & TANIS, P.C.

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KALAMAZOO, MI 49008-1631

EXAMINER

SKOWRONEK, KARLHEINZ R

ART UNIT

PAPER NUMBER

1631

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/19/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/579,504

Applicant(s)

KIM ET AL.

Examiner

Karlheinz R. Skowronek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05-15-2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

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## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Group I (claim 1-8 and 18) in the reply filed on 25 January 2007 is acknowledged. However upon further consideration, the examiner has rejoined the method (claims 9-17) with the system claims (1-8 and 18). The groups were restricted based in part on belonging to two different statutory classes process and machine, i.e. different inventive categories. Apart from the difference in the inventive categories, the groups have mirroring functionalities. Amendment to the claims that eliminates the parallelism between claims 1-8, 18 and 9-17 may result in a new restriction requirement.

### ***Claim Status***

Claims 1-18 are pending.

Claims 1-18 are being examined.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

*To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways:*

- *The claimed invention "transforms" an article or physical object to a different state or thing.*
- *The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.*

In the instant case, the claimed invention does not "transform" an article or physical object to a different state or thing. This does not preclude the subject matter to be patentable as, for eligibility analysis, as

*physical transformation "is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application." AT&T, 172 F.3d at 1358-59, 50 USPQ2d at 1452. If the examiner determines that the claim does not entail the transformation of an article, then the examiner shall review the claim to determine if the claim provides a practical application that produces a useful, tangible and concrete result. In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." The claim must be examined to see if it includes anything more than a § 101 judicial exception. If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101. If the examiner does not find such a practical application, the examiner has determined that the claim is nonstatutory.*

In the instant case, the question is thus whether the final result achieved by the claimed invention produces a result which satisfies all three criteria of being useful, and concrete, and tangible. In determining if the instant claims are useful, tangible, and concrete, the Examiner must determine each standard individually. For a claim to be "useful," the claim must produce a result that is specific, substantial, and credible. For a claim to be "tangible," the claim must set forth a practical application of the invention that produces a real-world result. For a claim to be "concrete," the process must have a result that can be substantially repeatable or the process must substantially produce the

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same result again. Furthermore, the claim must recite a useful, tangible, and concrete result in the claim itself. In addition, a claim must be limited only to statutory embodiments. Thus, if the claim is broader than the statutory embodiments of the claim, the Examiner must reject the claim as non-statutory.

*(1) "USEFUL RESULT" For an invention to be "useful" it must satisfy the utility requirement of section 101, i.e., it has to be (i) specific; (ii) substantial and (iii) credible.*

*When the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three § 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical application. In such cases, statements in the specification describing a practical application may not be sufficient to satisfy the requirements for section 101 with respect to the claimed invention.*

In the instant case, while specification addresses some general utilities of DNA chips, there is no recitation of a practical application in the claim.

*If the specification discloses a practical application of a § 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected.:*

In the instant case, the claims are directed to computational system for analyzing a biochip. Such method is not directed to any practical application of thus analyzed biochip. The analysis of a biochip is credible. The claims nor the specification fail to describe any specific utility from analyzing a biochip. Further, the neither the claim nor the specification recite any substantial utility from analyzing a biochip.

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*(2) "TANGIBLE RESULT" The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a § 101 judicial exception, in that the process claim must set forth a practical application of that § 101 judicial exception to produce a real-world result. The opposite meaning of "tangible" is "abstract."*

The instant claims are drawn to computational means for analyzing a biochip. However, as claimed, the method does not include a real world result. For example, method as claimed may occur entirely within the confines of a computer or human mind without any communication to the outside world. Thus, the instant claims do not include any tangible result.

*(3) "CONCRETE RESULT" Usually, this question arises when a result cannot be assured. In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. The opposite of "concrete" is unrepeatable or unpredictable.*

In the instant case, the method seems to be concrete in that, for a given set of gene expression and GO terms, it would produce a reproducible number associations and distances.

Thus, the final result achieved by the claimed invention produces a result which does not satisfy all three criteria of being useful, and concrete, and tangible.

***Claim Rejections - 35 USC § 112, Second Paragraph***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7 and 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 and 16 are unclear with respect to the relation of the GO terms. Specifically, how is it that a GO term that is the "lowest" term among all GO terms in a graph has any other terms that are "lower" ?

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Cheng et al (USPG PUB US2004/0126840).

The claims drawn to a system, claims 1-8, a method, claims 9-17, and a software product, claim 18, for analyzing a biochip which comprise receiving statistical gene cluster data and assigning relevant GO terms. The GO terms are then converted into numbers which are used to determine the distance between the GO terms assigned to genes within the cluster.

Cheng et al teach a method, software product and genomic web portal system for analyzing gene chip data in which genes within gene cluster data obtained from a gene chip or microarray is assigned a GO term ([008], [0181], and [185])(cl. 9). The system being composed of an assigning part, a converting part, and an extracting part (fig 17 and at least [0002, 0006, and 0012]). The system of Cheng can also be stored as computer executable instructions on any suitable computer readable medium ([0042]) (cl. 18). Cheng et al obtain the GO terms and other information used in associating with the gene chip data from mining biological databases ([0165])(cl. 2 and 10). Once the GO terms are assigned they are converted into numbers (cl. 1 and 9) based on position in the digraph (cl. 3 and 11) ([0167] and [0169]). Cheng et al teach the calculation of a distance metric for each GO term in the Digraph. The distance measures are used then to identify the distances between genes in the cluster ([0169]) and determining an optimum GO term for the cluster ([0173 to 0174]) (cl.1 and 9). Cheng et al teach further the construction of a pairwise similarity matrix reading on a optimum cross point extractor that is used to determine pseudo distances (similarity) between the GO tree and the annotations of the array (cl. 14 and 4). Cheng teach the calculation of weighting factors for each node in the graph as a function of the distance between a node in the tree and the root of the tree reading on pseudo distance. The weight calculator of Cheng et al determines the maximal distance or weight for a path between root and node ([0196]) and determines the average weight for a comparison of nodes ([0203]). Cheng et al teach an optimum node matching part for comparing average weights or maximal weights ([0200]) and determining a GO term with a minimum value of the



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average pseudo distance or of the maximum pseudo distance (cl.15). Cheng accomplish this by establishing a similarity score for a comparison between two nodes. The closer the nodes are in the tree the larger the similarity score, therefore by determining a maximal similarity score Cheng et al identifies the optimum matching node and determines the Go term with a minimal distance ([0196-0207]). Cheng et al teach GO terms are part of a tree (cl.5 and 12) and that the GO terms are included in a selected level of the GO tree ([0192])(cl. 6 and 13). Cheng et al teach a Go tree structure to comprising levels to which weights are assigned to nodes based on the level in the tree ([0194])(cl. 8 and 17).

With respect to claims 7 and 16, the term "lowest" is being interpret to mean root and lower is being interpreted to mean a level in the graph that is arrived at by traversing any path into the graph to arrive at nodes that are linked to the root ([0195]). Cheng et al teach determining a weight that relates the path between two nodes that are linked through the root node to be a maximal path weight ([0195 and 0196]).

### ***Conclusion***

No claims Allowable

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karlheinz R. Skowronek whose telephone number is (571) 272-9047. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karlheinz R. Skowronek/

MICHAEL BORIN, PH.D  
PRIMARY EXAMINER

